

Claims

- [c1] 1. A system for horizontally moving an expandable room structure between a retracted position within a vehicle and an extended position protruding outwardly from a wall of the vehicle while providing for limited controlled vertical movement of the room relative to the vehicle, the system comprising:
- a vehicle wall including vertically extending structural members that define an opening in the vehicle wall;
 - an expandable room structure including top, bottom and side structural members which define an interior end wall and an exterior end wall disposed generally parallel to the vehicle wall and which further define side walls extending generally perpendicular to the interior end wall and exterior end wall, the expandable room being positioned for movement through the opening in the vehicle wall from a retracted position to an extended position;
 - a power device mounted in one of the vertically extending structural members of the vehicle wall adjacent the opening in the wall;
 - a drive chain combined with the said one of the vertical structural members of the vehicle wall and having a plu-

ality of pivotally connected links extending between end links, the links being capable of pivoting in one direction only thereby providing for the chain to be pulled by tensile forces applied to the chain or pushed by compressive forces applied to the chain;
one of the end links of the drive chain being operatively connected to the power device and the other end link being operatively connected to the interior end wall of the expandable room with the chain extending mostly vertically when the expandable room is in the extended position and mostly horizontally when the expandable room is in the retracted position; and
a guide member combined with the vertically extending structural member containing the power device to guide the drive chain between vertical and horizontal positions, whereby actuation of the power device causes the chain to move the expandable room between retracted and extended positions.

[c2] 2. The system for horizontally moving an expandable room structure of Claim 1 in which the power device is a hydraulic cylinder vertically mounted in the vertically extending structural member of the vehicle wall.

[c3] 3. The system for horizontally moving an expandable room structure of Claim 2 in which there is a second hydraulic cylinder in a second vertically extending struc-

tural member adjacent the opening in the vehicle wall, and a second drive chain is combined with the second vertically extending structural member of the vehicle wall, the second drive chain being operatively connected to the second hydraulic cylinder and to the interior end wall of the expandable room.

[c4] 4. The system for horizontally moving an expandable room structure of Claim 3 in which the hydraulic cylinders are combined with a synchronizing cylinder that synchronizes the operation of the hydraulic cylinders so that movement of the drive chains will be at the same rate.

[c5] 5. A system for horizontally moving an expandable room structure between a retracted position within a vehicle and an extended position protruding outwardly from a wall of the vehicle while providing for limited controlled vertical movement of the room relative to the vehicle, the system comprising:
a vehicle wall and floor including vertically extending structural members that define an opening in the vehicle wall;
an expandable room structure including top, bottom and side structural members which define an interior end wall and an exterior end wall disposed generally parallel to the vehicle wall and which further define side walls

and a floor extending generally perpendicular to the interior end wall and exterior end wall, the expandable room being positioned for movement through the opening in the vehicle wall from the retracted position to the extended position;

a power device combined with the vehicle wall structure and operatively connected to the expandable room to move the expandable room between its retracted position in which the floor is above the vehicle floor and its extended position in which the expandable room floor is substantially level with the vehicle floor;

a lifting mechanism for controlling the path of the expandable room when moved from its extended position to its retracted position, the lifting mechanism comprising:

a power lift cylinder combined with the vehicle floor beneath the floor;

a toggle assembly operatively connected to the power lift cylinder and pivotally moveable from a raised position to a lowered position;

a slide block pivotally connected to the toggle assembly and positioned to be engageable with a structural member of the floor of the expandable room to guide and partially support the room as it moves between retracted and extended positions; and

a room mount bracket attached to the expandable room

beneath the floor of the room and aligned to engage the toggle assembly as the expandable room moves between the retracted position and the extended position and thereby control the path of the room as it moves between a position above the vehicle floor to a position substantially level with the vehicle floor.

- [c6] 6. The system for horizontally moving an expandable room structure of Claim 5 in which there is a lifting mechanism beneath each side of the expandable room.
- [c7] 7. The system for horizontally moving an expandable room structure of Claim 6 in which the lifting mechanism beneath one side of the expandable room is the master mechanism and the lifting mechanism on the other side of the expandable room is the slave mechanism.
- [c8] 8. The system for horizontally moving an expandable room structure of Claim 7 in which the master lifting mechanism also includes a safety switch mechanism that is engageable by the room mount bracket when the toggle assembly is in the raised position, the switch mechanism interacting with the power lift cylinders to prevent premature dropping of the expandable room as it moves to a fully extended position.
- [c9] 9. A system for horizontally moving an expandable room

structure between a retracted position within a vehicle and an extended position protruding outwardly from a wall of the vehicle while providing for limited controlled vertical movement of the room relative to the vehicle, the system comprising:

a vehicle wall and floor including vertically extending structural members that define an opening in the vehicle wall;

an expandable room structure including top, bottom and side structural members which define an interior end wall and an exterior end wall disposed generally parallel to the vehicle wall and which further define side walls and a floor extending generally perpendicular to the interior end wall and exterior end wall, the expandable room being positioned for movement through the opening in the vehicle wall from a retracted position to an extended position;

a power device mounted in one of the vertically extending structural members of the vehicle wall adjacent the opening in the wall;

a drive chain combined with the said one of the vertical structural members of the vehicle wall and having a plurality of pivotally connected links extending between end links, the links being capable of pivoting in one direction only thereby providing for the chain to be pulled by tensile forces applied to the chain or pushed by compres-

sive forces applied to the chain;
one of the end links of the drive chain being operatively connected to the power device and the other end link being operatively connected to the interior end wall of the expandable room with the chain extending mostly vertically when the expandable room is in the extended position and mostly horizontally when the expandable room is in the retracted position;
a guide member combined with the vertically extending structural member containing the power device to guide the drive chain between vertical and horizontal positions, whereby actuation of the power device causes the chain to move the expandable room between its retracted position in which the floor of the expandable room is above the vehicle floor and its extended position in which the expandable room floor is substantially level with the vehicle floor; and
a lifting mechanism for controlling the path of the expandable room when moved from its extended position to its retracted position, the lifting mechanism comprising:
a power lift cylinder combined with the vehicle floor beneath the floor;
a toggle assembly operatively connected to the power lift cylinder and pivotally moveable from a raised position to a lowered position;

a slide block pivotally connected to the toggle assembly and positioned to be engageable with a structural member of the floor of the expandable room to guide and partially support the room as it moves between retracted and extended positions; and
a room mount bracket attached to the expandable room beneath the floor of the room and aligned to engage the toggle assembly as the expandable room moves between the retracted position and the extended position and thereby control the path of the room as it moves between a position above the vehicle floor to a position substantially level with the vehicle floor.

[c10] 10. The system for horizontally moving an expandable room structure of Claim 9 in which the power device is a hydraulic cylinder vertically mounted in the vertically extending structural member of the vehicle wall.

[c11] 11. The system for horizontally moving an expandable room structure of Claim 10 in which there is a second hydraulic cylinder in a second vertically extending structural member adjacent the opening in the vehicle wall, and a second drive chain is combined with the second vertically extending structural member of the vehicle wall, the second drive chain being operatively connected to the second hydraulic cylinder and to the interior end wall of the expandable room.

[c12] 12. The system for horizontally moving an expandable room structure of Claim 11 in which the hydraulic cylinders are combined with a synchronizing cylinder that synchronizes the operation of the hydraulic cylinders so that movement of the drive chains will be at the same rate.